CASE REPORT

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Anal swab findings in an infant with COVID-19

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ABSTRACT

Introduction: The transmission pathways of coronavirus disease 2019 (COVID-19) remain not completely clear. In this case study the test for the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in pharyngeal swab and anal swab were compared.

Case presentation: A 3-month-old girl was admitted to our hospital with COVID-19. Her parents had both been diagnosed with COVID-19. The results of pharyngeal swab and anal swab of the little girl were recorded and compared during the course of the disease. The oropharyngeal specimen showed negative result for SARS-CoV-2 on the 14th day after onset of the illness. However, the anal swab was still positive for SARS-CoV-2 on the 28th day after the onset of the illness.

Conclusion: The possibility of fecal-oral transmission of COVID-19 should be assessed. Personal hygiene during home quarantine merits considerable attention.

KEYWORDS

COVID-19, Anal swab, SARS-CoV-2, Fecal-oral transmission

INTRODUCTION

Since December 2019, several clusters of pneumonic patients with unclear etiology in Wuhan, China have been reported. Most of these cases are epidemiologically correlated with a local seafood and wet animal market.[1] The novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has been identified as the pathogen responsible for the pneumonia.[1] There have been only a few reports on the transmission routes of this novel coronavirus disease 2019 (COVID-19) since the beginning of the outbreak. The first clear conclusion is that it can be transmitted by direct exposure at the market.[2] Since then, person-to-person transmission of COVID-19 has been confirmed,[3] and asymptomatic individuals have also been identified as potential sources of infection.[4] As of March 5, 2020, nearly 80 552 cases with COVID-19 had been confirmed in China with at least 3042 reported deaths.[5]

Recent studies have indicated that the main clinical manifestations of COVID-19 are fever, cough, and dyspnea. Less common symptoms were sputum production, headache, hemoptysis, and some gastrointestinal symptoms. Although the gastrointestinal symptoms, including diarrhea (2%–10.1%), nausea, and vomiting (1%–3.6%), do not seem to be common at present,[6,7] a significant proportion of patients initially presented with atypical gastrointestinal symptoms.

Several reports noted that the stool specimens from the patients with COVID-19 were positive for the novel SARS-CoV-2.[8,9] Also the live SARS-CoV-2 has been isolated from the stool specimens of the patients with COVID-19 by several independent groups.[10] These results indicate that fecal-oral transmission may be one of the routes.

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TABLE 1 Results of real-time RT-PCR tests for the novel SARS-CoV-2

Specimen	Day 1	Day 7	Day 10	Day 14	Day 17	Day 21	Day 28
Oropharyngeal swab	+	+	+	–	–	–	–
Anal swab	NT	NT	+	+	+	+	+

+, positive; –, negative; NT, not tested.

CASE REPORT

A 3-month-old girl, suffering from diarrhea lasting for 4 days and fever 1 day, was admitted to the Department of Pediatrics of the First Affiliated Hospital of Yangtze University on January 31, 2020. The girl had a history of good physical health with no underlying diseases, but she had returned to Jingzhou (Hubei province of China) from Wuhan with her parents 10 days before. Of note, her parents had been diagnosed with COVID-19 using real-time RT-PCR for the viral RNA from oropharyngeal specimens two days earlier. Physical examination of the girl revealed fever (38.2 °C), and laboratory examination revealed high neutrophil levels (86.2%) and reduced lymphocytes (7.1%). On January 31, 2020, the oropharyngeal swabs of the patient were positive for SARS-CoV-2. A chest CT indicated no evidence of infiltrates or abnormalities. On the 2nd day after admission, her temperature returned to normal. On the 4th day, diarrhea completely recovered. The oropharyngeal swab was negative for SARS-CoV-2 on the 14th day after onset of the illness. However, the anal swabs remained positive for SARS-CoV-2 on the 28th day after the onset of the illness (Table 1). The infant has been discharged on March 1 and is in good condition now.

DISCUSSION

Several different receptors have been shown to bind to different types of coronaviruses. These include the angiotensin-converting enzyme 2 (ACE2) for SARS-CoV. Lu et al[11] showed that the structure of the receptor-binding domains between SARS-CoV and the novel SARS-CoV-2 was similar using molecular modeling, indicating that ACE2 might also be the receptor for SARS-CoV-2, although amino acids in the receptor-binding domain of SARS-CoV-2 are different from those of SARS-CoV. The abundant presence of ACE2 in the epithelia of the lung and intestine is widely acknowledged, and this ACE2 might be part of one route of COVID-19 transmission. Previous studies have proved the presence of viral nucleic acids in fecal samples and anal swabs of patients with COVID-19, but the implications of this require further investigation.[12] The possibility of fecal-oral transmission in SARS-CoV-2 infection should be taken into consideration. More attention should be paid to the hand hygiene and disinfection of patients' vomitus, feces, and other excretions.

In our case, anal swabs showed positive in the patient without any symptoms nearly a month later. Current discharge standards are as follows: The patient's body temperature must remain normal for over 3 days; respiratory symptoms must be significantly relieved; lung inflammation must show obvious signs of absorption; and tests for viral nucleic acid must be negative for two consecutive times, sampled at least one day apart.[12] If we had not tested this anal swab, the patient might have been discharged from the hospital half a month ago. Given that the patient was 3 months old, her caregivers were likely to be exposed to feces or other body fluids containing the virus. We conclude that when discharged patients are isolated at home, their family members should pay very close attention to hand hygiene and avoid sharing a toilet with patients wherever possible. In households without a separate toilet, patients can be isolated and the rest room must be disinfected using 75% ethanol, chlorine containing disinfectant, peracetic acid, chloroform, or other fat solvents after each use.

In conclusion, this case suggests the possibility of fecal-oral transmission of COVID-19 for nearly one month. We should pay attention to personal hygiene during home isolation and further explore the possibility of fecal-oral transmission. Also further research is needed to find out whether the positive result of anal swab is due to the fragments of viral nucleic acid or live viruses.

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CONSENT FOR PUBLICATION

Written informed consent was obtained from the patient's guardians.

CONFLICT OF INTEREST

None to declare.

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